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Two Frontiers in Rural Management: Agricultural Extension and Managing the Exploitation of Communal Natural Resources

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*by Robert Chambers**

Introduction

It is odd that we talk of farm 'management,' water 'management,' and the 'management' of natural resources, all referring to things, but of rural and agricultural 'administration' when we refer to people. Quibbles over the actual or desirable meanings of words are often not fruitful. But the fact is that our attitudes are influenced by the connotations and associations of words and that, in this case, those of 'management' are generally more active, positive, opportunity-seeking, aggressive, developmental and change-oriented; whereas those of 'administration' are more passive, negative, unenterprising, static and status quo-oriented. The physical and biological scientists have appropriated 'management' for the manipulation and control of the physical and organic environment, while social scientists and others appear generally content to be left with 'administration' to describe the handling and control of people in rural organizations and communities. These usages are so well established that I shall not kick against the pricks by challenging them. But we may start by noticing that they are linked with omissions in research, in official attitudes and concerns, and in the attention of would-be reformers. Use of 'management' for farms, water and resources and of 'administration' for people has obscured the potential of a management approach to people, especially people in organizations. In particular there has been:

(a) a failure to approach the opportunities and problems of agricultural extension as opportunities and problems of management – that is, of managing extension agents, for which the techniques and insights of management theory and practice can be used;

(b) a failure to see that the opportunities and problems of managing communal natural resources involve a dimension of human management – that is, of the management of men in organizations and in communities.

These failures have not, of course, been absolute; rather they have been widespread tendencies. The main theme of this paper is that whatever other priorities in rural and agricultural administration there may be, these two should be considered for placing high on the list. And their previous neglect makes them, a little surprisingly, frontiers for exploration and experiment.

The argument could spread very widely. For the purposes of this paper I shall confine it largely to the management of agricultural extension and the management of those who manage communal natural resources. This is partly because these are functions of so many governments and may indeed often be unavoidable responsibilities for governments. There is scope for much argument about the extent to which other services such as credit, input supply and marketing should be provided by government or para-statal organizations, or through various controlled or *laissez-faire* approaches making use of the private sector. But there is much less room for argument about agricultural extension (including its research aspects) which in practice is always a function in part performed by direct government intervention; or about the management of communal resources (water, forests, fisheries, soil, wildlife, grazing) which in practice is very often a responsibility assumed by governments. Those who provide inputs or marketing may often, perhaps increasingly, be managed in organizations with a business management orientation. Those who provide agricultural research and extension and who manage communal resources are likely, if the evidence of the past can be projected, to remain as government staff in government organizations.

The evidence is drawn from a mixture of personal experience and secondary sources, both deriving from Eastern Africa and South Asia. The description and assertions do not apply to these regions in their entirety, and may not always apply outside them; I believe them nevertheless to be generally true, and I should be surprised if the conclusions do not apply widely. If it can be shown that there are places where they do not apply, then those places may be high priority for research, so that the benefits of the lessons learnt there and the techniques developed there can be more widely available.

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Three red herrings

In considering the management of agricultural extension and the management of those who manage communal resources, there are three supposed paths to improvement which are broad, plausible and misleading. They are so commonly advocated and yet often of such doubtful value that they are worth setting out.

The first is stating that there is a need for more (or better) co-ordination. This word 'co-ordination' is an admirable means of evading clear and detailed thought and prescription. It is a strong favourite among consultants writing their reports under pressure of time. It comes to the surface of one's mind very readily whenever a detailed organizational or procedural detail comes up for decision and can be used to avoid facing the issue, whatever it is. It glosses over awkward unknowns. It can be used, as in India, whenever complex problems drive the observer to despair. In one report 'co-ordination' and its homologues appeared once in roughly 220 words (FAC 1970). It is used sometimes as an evasive synonym for 'authority' and 'power.' A call for more or better co-ordination may really mean a call for more or greater authority and power for whoever is to be the co-ordinator. Further, it is often accepted as so unquestionably good that more of it is always desirable, and maximum co-ordination is best of all. Thus, another report:

'Within the executive organization there needs to be the maximum co-ordination between irrigation engineering, agricultural development and land settlement at all levels' (UNDP/FAO 1969:17).

But a little reflection shows that co-ordination consists of communication – through meetings, through visits, through writing. If these were maximized, then output would be minimized. It is optimal, not maximum, co-ordination that is required. But the wisest conclusion is perhaps that it is the use of the word itself that should be minimized, and more precise expressions used wherever reasonable. The writer or speaker would then be forced into confronting the reality of the procedures and relationships with which he is concerned and compelled to be more specific about them.

The second red herring is ministerial reorganization. It is far easier and often more congenial for the visiting consultant or the senior civil servant to meet officials in their offices in the capital city, than it is to dig into the rural reality of the lower levels. It is far easier to write a report suggesting the transfer of department A to Ministry B, or the amalgamation of accounting in division C, or whatever on similar lines, than it is to confront the problems of management at the lower and field levels. Moreover, there is (supposedly, at least) more internationally available expertise in the former than the latter. But more than this, reorganizations at a high level are often very acceptable since promotion and increases in emoluments are common under such circumstances and demotion or loss of salary rare. There have been good and useful reorganizations of Ministries, especially perhaps of Ministries of Agriculture, and further reorganizations may often be desirable. But they may not be the highest priority, which may lie in less obvious, less easy, but more basic questions of management at the field level.

The third red herring is the call for more discipline and harder work. Often this is linked with the imposition of a system of targets set high up and transmitted downwards with ominous threats and cajoling, a system which has been generally condemned (e.g. by Hunter, 1970). It implies a more authoritarian and hierarchical organization and style of operation (for analyses see especially Heginbotham, 1973; Mook, 1974; and Moris, 1972). In the circumstances of many countries it is likely to be dysfunctional through the evasion and false reporting which it generates. Part of its weakness is that it represents a reflex of frustration. Discipline and hard work are called for at precisely the time when they are not forthcoming and the person calling for them does not understand why. A more careful and sympathetic analysis is required, one that will reveal the particular circumstances and needs of each managerial situation.

A more careful direction for concern and attention emerges: instead of calls for more and better co-ordination, detailed specification of procedures to promote it; instead of reorganization at the ministerial level, management at the field level; instead of authoritarian demands for more work, a humane understanding of the position of field staff. With these basic orientations, we can turn to an examination of the management of agricultural extension and of communal resources.

Agricultural extension – misperceptions and realism

It is useful to begin by examining some perceptions of agricultural extension and by trying to assess the reality which lies beyond them. There is a tension here between two sets of evidence. On the one hand there is the rosy impression given by official statistics, by official visits to the field, and by some quantitative social science research. On the other hand there is the depressing picture compounded of the critical scepticism of senior officials and of the findings of some case-study social science research. Let us consider these two sets of evidence and perception in turn.

A rosy impression of the effectiveness of agricul-

tural extension is often given by official statistics for the achievement of targets when these targets are reported by those responsible for achieving them. Sometimes, as in Tamil Nadu (India), this has provoked a periodic scaling down of statistics to compensate for widespread over-reporting. The impression is, however, sustained by the way in which visits by senior officials are organized by junior officials all the way down the line. What the senior official is shown is almost invariably the better-served and more progressive villages, and the more progressive farmers within those villages. Frequently too these visits have an urban bias, with exposure only to that which is close to and easily accessible to an urban centre, a good rest house or hotel, and a main road.

That some quantitive social science research should support these impressions is a little surprising. But sometimes survey researchers follow the guidance of officials in the selection of what to study, reinforcing urban and progressive biases. The objectives of study may be limited to 'progressiveness' rather than backwardness, to adoption rather than reasons for non-adoption, to identifying the characteristics of an area where an innovation has spread rather than those of an area where it has not spread. The very heavy concentration of research in IADP districts in India (Harriss, 1974) is a case in point. Moreover, statistical social survey techniques, particularly when undertaken with visible official support, are liable to elicit heavily exaggerated responses from farmers when they are asked about extension contact (Chambers and Wickremanayake, 1974) and whether they are satisfied with the services they receive. When the interviewer has been brought to a farm interview by an extension worker in a government vehicle, it is scarcely to be wondered at that the farmer says that he is regularly visited by the extension worker and is satisfied with the services he receives.

To some degree, too, a false impression of successful extension has been given by the fashion for extension education research, which emphasizes the process of communication rather than the value of the message. Extension is difficult to evaluate, but one of the easiest components to measure is communication; and this has encouraged a tendency to study extension education rather than the more complex and difficult and, in my view, more important subject of the value of the advice or technology offered to the farmer. All too often, better communications might be worse for the farmer because the advice itself is bad. In sum, evaluation of communication is liable to two over-favourable biases: first, deferential or prudent responses from those interviewed; the second, from failure to notice bad messages, counting only whether the potential innovator has received the message. In both cases the outcome can be a misleading favourable impression of the effectiveness of the extension process as a whole. Finally, it is sad to have to admit that there is much diplomacy in the choice of topics and tools for social science research, abjuring those which would embarrassingly reveal corruption and inefficiency and concentrating on those which conveniently avoid or filter out such discordant information. In this respect, quantitative survey research is conveniently aseptic and selective.

In contrast, a depressing picture of agricultural extension is coloured partly by the critical scepticism of senior officials. They guess that the statistics of achievement are exaggerated, that they are shown only the best, that there is widespread corruption and inefficiency, that things are not as they are presented to them. But they are prevented by the hierarchical and official structure of their perceptions from seeing things as they really are; and knowing or suspecting this they may take refuge in exaggerating private cynicism to compensate for the public optimism required by their roles. Their low assessment of agricultural extension does, however, receive support from the work of those social scientists who manage to penetrate through to what actually happens at the lowest levels of administration, often combining case studies with surveys. The work of Cliffe and others (1968) in Tanzania, Leonard (1970, 1971, 1972) in Kenya, Harrison (1969) in Nigeria and Heginbotham (1973) and Mook (1974) in India has uncovered variously a world of low hours of work, of lack of imagination, of service confined to the more influential farmers, of petty corruption, of work restriction, of false reporting, and of authoritarian management by senior officials. Most observers can quote incidents and examples of such activities as the systematic falsification of diaries in order to claim maximum nights-out allowances, of inputs being supplied only to the richer and more influential, of corruption and of abuse of junior officials by their superiors. Unfortunately, such studies of agricultural administration are rarely published; but their outrageous contents are read, remembered and regaled as stories, to the neglect of the evidence they also present of positive achievement, thus again reinforcing the negative and pessimistic view of performance of agricultural extension.

We can expect that neither the rosy nor the depressing view is balanced. The truth can be sought somewhere between them. Case studies of individual extension workers (for example, Dubey *et al.*, 1962; Kothari, 1967) have gone out of fashion; but the better of these studies were probably more useful sources for policy insights than the scholastic volumes on extension education and

the like which have followed them (and which leave one wondering whether communications specialists could not improve their own communication). For what case studies show is that extension workers are human beings behaving fairly rationally in the social, economic and work situations in which they find themselves; and they suggest that with better management, they might perform better on the job. The question, indeed, is not so much one of how well they perform at present, but rather of how they might perform under a better designed and adapted system of management.

A further advantage of case studies is that if they are good they reveal what agricultural extension staff actually do. A common myth is that their main task is advising farmers and particularly making visits to individual farmers. Perhaps this is the main task of extension in some of the richer countries. It is often not so in Eastern Africa and South Asia. There is a good deal of evidence that much of extension workers' time is, or has been, taken up with regulatory functions, with guessing and reporting data, with input supply and marketing, with organizational routine, and with special projects and programmes which may or may not involve individual farmer visits. There are great contrasts both between and within countries in the balance of work and the degree of pressure on extension agents. Regulatory functions, such as preventing agriculturally undesirable practices, are often now of diminished importance. Data guessing and reporting, however, appear widespread and demanding. An agricultural instructor in Sri Lanka can have as many as 29 reports and returns to submit each month. In Kenya it is common for junior agricultural staff to spend from one to three days each month compiling reports. Various forms of organizational routine also take up time. For change agents generally in Tamil Nadu, Mencher has expressed her opinion that 'if a lower change agent . . . wants to spend much time helping people, he must do it mostly in his spare time because over 80 per cent of his time will be spent in attending to bureaucratic concerns' (1970: 1196). On top of this, input supply and rationing have become a major activity in some countries. Wherever fertilizer and agro-chemical scarcity is mediated through extension workers, it can be expected to absorb much of the time, not least because of the opportunities provided for petty corruption to supplement the extension workers' real incomes as these diminish rapidly with inflation.

After all these other activities and demands, advisory work is liable to be a residual, and a minor one at that. My own impressions confirm that much more time is spent on routine and much less on advisory work than is believed in the management myths of extension. To take but one example, in North Arcot District in Tamil Nadu the official fiction is that a *grama sevak* (extension worker) should visit each village for which he is responsible two or three times a month and that he should be 'guide, philosopher and friend' to the farmers. But according to investigators who maintained contact with 11 villages over a full agricultural year (1973/74) five of them were not once visited by a *grama sevak* during that period.

Functions and stages

The situation requires planning and management. The planning relates to choices of what extension staff should do. The management relates to how they should be induced to do it. Both often go largely by default.

The planning choices of what agricultural extension staff should do, if fully examined, are exceedingly complex. In practice they have to be simplified. It is helpful here to begin by seeing how the tasks of extension change over time as development takes place. At first, in the earlier stages, their functions tend to be regulatory for farmers in general and advisory only for a small group of 'progressive' farmers. Credit is often identified as a constraint and administered by them, leading them into a debt-collecting role. In these earlier stages of entry into a cash economy it may be important for extension staff to collect data on acreages planted and progress made. Those higher up and responsible for crop campaigns need rapid feedback on progress and staff themselves are forced by data collection into contact with those who are growing the new crops and whom they should be advising. The work load is usually realistic and manageable.

Later, however, the work load gets out of hand. New programmes and priorities flow out from headquarters and bury the old which are rarely formally abandoned. As special programmes and projects multiply, the extension agent, faced with the impossibility of doing everything that is required of him, adopts the sensible strategy of concentrating on whatever appears most visible, unavoidable and likely to be inspected, in the hope that in this way he can at least avoid getting into trouble, even if he cannot expect any positive reward. He cannot possibly know the acreage under the many different crops but he is confronted with not just a continuing but an expanding demand for information from his seniors. So he invents data. As the suspicion grows that all is not as it should be, targets are set from above to try to ensure harder work, and in consequence the data reported become inflated and exaggerated by field staff in order to show that they have achieved or exceeded the targets that were demanded of

them. As the information filtering up through the extension hierarchy becomes unreliable, another organization is created or adapted in order to obtain more accurate information, but without abandoning the demand through extension. Two streams of conflicting data then flow upwards to mystify and confound the planners. Meanwhile, overloaded with the numbers of projects and programmes, each of which has its own inescapable paperwork, the extension worker becomes increasingly office-bound. A new food drive, or a new young farmers' programme, requires even more reports than before and perversely ties him even more to the office, reducing even further his now tenuous contacts with actual farming. But under personal financial pressure he claims full travel allowances on the basis of a diary falsified for the sake of the auditors and a fictitious monthly return of days and nights out. In fact he cannot often leave his headquarters. The remoter villages and the smaller farmers get no advice, and no services unless they come and bang on his desk.

in Kenya, when broken down to location (sub-sub-district) level, was found to make demands on extension staff time, over a year, which varied from 474 per cent of that available in the peak month to only 18 per cent in the slackest month (Belshaw and Chambers, 1971, appendix D). It is better that staff should be expected to do less and actually do it and do it well, than that they should be so overburdened that they do nothing properly. Bold economizing decisions are needed to cut out some activities and to concentrate on a narrower band of action. Later decisions to add another activity should be accompanied by compensating decisions to abandon an equally demanding activity.

The second principle is that of compatibility, and can be applied to selecting the narrower bank of activity. Four main categories of activities of extension (apart from bureaucratic routine and special programmes and projects) and some of their implications can be presented diagrammatically:

functions	*the extension worker resembles*	*style of operation*	*relationship with farmers*	*movements/ location required by task*
Regulation	Policeman	Disciplinary	Hostile	Extensive local travel
Debt collecting	Dun	Predatory	Hostile	Extensive local travel
Data collecting and reporting	Survey enumerator and clerk	Monitoring Clerical	Passive	Extensive local travel
Input supply and rationing	Trader	Commercial	Servicing	Regular presence in HQ
Advisory-cum-research	Consultant	Innovative	Advisory	Travel and HQ

Principles for planning choices

This may verge on caricature. But I think it is true enough often enough to provide a background for discussing the principles which should apply to the planning choices of what agricultural extension staff should do. Four can be proposed.[1]

The first and basic planning principle is that choices between alternative activities should be identified and should then be taken. The time and energy of extension staff at the lowest levels tend to be regarded as infinitely elastic; in fact they are, and should be treated as, finite and scarce. For example, a study of a district-level extension plan

This is obviously simplistic. The incompatibilities are less absolute than they may appear here. Regulatory and debt collecting functions induce a relationship with farmers which is widely believed to impede an advisory role; and there may often be conflicts between on the one hand input supply and rationing, requiring regular attendance at headquarters, and on the other advisory and research work which may require more travel. However, each situation is special and some incompatibilities, as in the highly differentiated agricultural administration of Tamil Nadu, can be handled through staff specialization. In general, it is better to apply the principle of compatibility case by case, with special reference first to the relationship with farmers, and second to the travel requirements, than to try to generalize from it for all circumstances.

A third principle is that agricultural extension

[1] This is a particular instance of a general phenomenon. For an exposure in greater breadth, see Hunter, 1974.

should not do what other organizations can or should do as well or better or cheaper. Much data collection (besides being largely useless) can be eliminated on the grounds that government statistical departments should often to able to do it better, if they do not do it already. Input supply and rationing may be eliminated by handing them over to co-operatives or to the private sector (though extension may remain a spearhead for introducing, for example, new seeds if no other organization will do this). Again, each set of circumstances is special.

A fourth principle, though obvious, is more difficult to accept. It is that the tasks given to extension staff should be limited to what they are capable of doing. To be sure, there is often a case for management reform, for management training and for recruiting higher calibre staff. But in the meantime what is given to the staff to do should be within their capabilities and those of their organizations. One should therefore be careful in advocating, for example, wholesale adaptive research with a high degree of devolution to the lowest levels, however desirable that may appear and even be as a long-term objective, if the calibre of staff and the hierarchical communication and decision system within which they operate make it unlikely to succeed. It follows from this that for organizations and staff who are competent at routine but poor at imaginative innovation and adaptation, programmes should be devised that are routine.

Tasks and techniques

Even if these four general principles are applied, the choice of activities for agricultural staff must always depend heavily on local technical, economic, social and political conditions and priorities. In current debate, however, two foci stand out and will be considered in turn.

The first is the advisory function, associated with local-level research and encouraging the adoption of new crops, seeds and practices. There is wide agreement here that well-organized demonstrations are among the most effective means of spreading good new practices, and that more research, sometimes described as adaptive research, should be carried out in field conditions.

The second focus is the desire to reach the smaller and less-well-off farmers. This is much less well articulated in practice than the more general advisory objective, and much less energetically pursued.

The difficulties of the first advisory-cum-research function can be illustrated by the observation of M.S. Swaminathan seven years ago that:

"The field extension staff, by and large, have been unable to win the respect of farmers, because of their poor technical and practical knowledge. They have, therefore, relied heavily on their control over input supply to invite visits from farmers. The lack of living contact with plants and an understanding of the factors limiting crop yields in the farmers' fields have rendered extension staff practically useless from the point of view of transmitting to the scientist problems requiring investigation . . ." (1967:568).

The failure to communicate upwards to the research scientists is a two-sided affair, and one answer is that the research scientists should themselves get out into the field more often. But another answer, which can be illustrated from Sri Lanka, is that a routine procedural approach should be adopted (as it is also in India and elsewhere), in which the extension staff are given tasks which are within their capabilities and through which the farmers gain quick and convincing experience of new crops and practices.

The very wide diffusion of paddy HYVs in Sri Lanka can partly be attributed to the fact that they have often been highly beneficial innovations for farmers according to farmers' own criteria. But recently a major additional factor in the speed of diffusion appears also to have been the system, sophisticated in its simplicity, of extension field trials, minikits and production kits which have been used there (Abeyratne, 1973:8-11). These are used on farmers' fields under the supervision of field extension staff. The extension field trials usually involve five of the best strains of paddy. These are grown in a farmer's fields under two different levels of fertilizer. Abeyratne has written:

"We insist that every Agricultural Instructor must personally set down these 'Extension Field Trials'. It has been a matter of debate as to why extension personnel should be involved in carrying out trials. The Extension Worker in contact with the farmer should himself be convinced of the performance of and must accept a new variety and its associated management practices . . . before he can convince farmers to do so. Our experience has been that getting the Instructor to lay out these trials not only keeps him in contact with problems of cultivation but also involves him directly in the programme and sets up a dialogue between him and the research staff on the one hand and with the farmer on the other."

The minikits which follow the extension field trials consist of the seed of four to five varieties together with fertilizers and agrochemicals. These are very

widely distributed free of charge to farmers. Finally, production kits are sold; these contain seed and fertilizer to enable farmers to bulk buy seed for future planting for themselves and for others.

This approach to paddy extension in Sri Lanka has had the advantage of being limited to one crop and has thus been analogous to the rather simple extension campaigns of one-crop organizations. But it has incorporated a number of sensible ideas: it involves a physical package which an extension worker has to do something with; the outcome can be inspected (at least in the case of the extension field trials); farmers can directly compare different varieties and treatments; the extension worker is offering something free (at least in theory) to the farmer; and farmers themselves learn from experience without all the information being blunted or distorted by passing through the extension research network.

This is an example of a sensible and practical approach to diffusion. It may be possible to move towards greater discretion at the lower levels of field staff as experience is gained. For more sophisticated research at the local level to be effective, perhaps involving several crops, two conditions may often be needed: more highly trained and technically competent staff; and a less authoritarian, deferential and hierarchical style of interaction within extension organizations. The 'crisis of trust' which R.N. Haldipur sees in contemporary Indian administration (1972:112) applies not least at the lowest levels, and not only in India. To enable divergent and discordant information to pass upwards through an authoritarian hierarchy a change of style is required. Partly this may be induced through the introduction of new management procedures; partly through training; partly through increasingly technical and professional levels of discourse. But any such changes can only be in the longer term.

The second focus, reaching the poorer and smaller farmers, is much harder to achieve. Extension workers are notoriously locked into relationships with the larger farmers. At an organizational level, there may quite often be opportunities to use the older and less well trained extension staff (who so often are overtaken by the more progressive farmers) for special programmes for the more backward farmers, while the progressives' needs are catered for by new specialists and by a more highly differentiated private sector. Whether this is so or not, management procedures may be particularly useful here. It is possible to build up a repertoire of techniques and programmes for getting through to the smaller and poorer farmers.[2] Work planning, self-setting of targets, and careful supervision combined with specially designed procedures may together be able to create situations in which it becomes as rational for an extension worker to pay attention to the poorer and smaller farmers as it is rational today for him not to do so. But to achieve such a result requires much more research and development work on the lower levels of agricultural extension. It also requires that the results of such research and development work should be made widely available. Moreover, no widespread campaign to reach smaller farmers can be expected to succeed unless it is supported by a convinced, credible and consistent political will. For only with political support can an extension worker be expected to withdraw his services from those who are better off, more powerful, and more able to reward or penalize him, and to concentrate them instead on those who are relatively disadvantaged.

Obviously these are only two possible future priority functions for agricultural extension staff. In the next few years there will be others, including the demonstration of more sophisticated and sparing methods of fertilizer applications and of water management. But whatever they are, it will be desirable that extension staff can be induced to do what is wanted. At one level, this can be tackled through the types of prescription which have been thrown out in the preceding paragraphs, suggesting particular procedures and techniques. But at a more general level, the problem can better be regarded as one of management in a wider sense, encompassing not just procedures, but also the whole range of aspects of organizations and motivations which influence staff performance. The underlying priority is for a management approach to agricultural extension.

Managing the exploitation of communal natural resources

If agricultural extension has often been misperceived, social scientists have barely perceived at all the management of those who manage communal resources. There are studies of departments of agriculture and of departments of community development, and of their activities; but I do not know (though they must surely exist) of any study in a Third World country of a department of soil conservation, forestry, wildlife, fisheries, range management or irrigation.

Many reasons can be suggested for this neglect. Agricultural development and small farmers have

[2] For a preliminary listing see Chambers, 1974:82. For an interesting and valuable report on an experiment in trying to reach farmers who had not adopted certain innovations, see Ascroft, Roling, Kariuki and Chege, 1973.

rightly occupied the centre of the stage in many countries, and the problems of innovation adoption, input supply and marketing have rightly been seen as immediate priorities. Conservation and natural resource utilization appear to be concerns of the earlier and later stages of development and less of the middle. The neglect is in some countries partly a hangover from an earlier experience. In tropical Africa for example the conservation of natural resources has been linked in the minds of people and political leaders with the much resented and often excessive restrictions of colonial rule: the soil conservation and terracing campaigns, the policing of forest boundaries to keep out cattle, the prohibition on cultivating the fertile strips beside streams, the protection of wild animals which were a public menace, and the fixed rotations of grazing control. In South Asia the rigid enforcement of water timetables and issues on irrigation projects during the earlier, colonial period, provides a parallel. Again, these departments offer returns only in the longer term (a gradual improvement in water supply as the forest regenerates, or timber in twenty years, or fish in five) or even lower returns (no more crops on steep slopes, the closing of areas to grazing, the exclusion of domestic stock from a nature reserve) compared with the quicker returns to agriculture. Moreover, the departments concerned with communal resource management are low in the scale of political and departmental status and often rather low in their financial and research allocations. They have no powerful political lobby: they represent no one but themselves in the politics of a country, and are often at loggerheads with those constituents they do have (forest dwellers or squatters, fishermen, hunters, pastoralists, irrigators). Their work, too, is usually split into separate areas (forests, lakes, game reserves, pastoral ranges, irrigation networks), in contrast with those more prestigious and powerful departments which have a representative at every level of administration in every part of the country. Finally, their work appears not only routine but regulatory. This makes them rather unattractive subjects of study for social scientists, conditioned as they are to value consultation and popular participation rather than enforcement.

That this neglect of the management of those who manage communal resources is serious may need less argument than it might have done a few years ago before the environment became fashionable; before there was a heightened awareness of our isolation on spaceship earth with its finite resources; before population began once again pressing hard on food supplies. Communal resource management is most crucially important where a change to lower levels of productive potential is irreversible except with vast capital investment or in geological time. Soil erosion is the main example, a subject which provokes extremes of either missionary passion or perverse blindness. But the neglect of communal resource management is also serious when the changes, though not irreversible, reduce shorter-term productivity — the replacement of watershed forests with shifting cultivation, the over-exploitation of fisheries, the degradation of grazing lands, the lowering of water tables, the waste of scarce water in irrigation systems. These physical and biological dangers and losses are exacerbated at the human and organizational level because of the tendency for harmful practices to be adopted precisely when and because there is pressure on resources. This makes it politically and administratively much more difficult to deal with them. It also makes the management of the men who have to deal with them a much more important subject for study and exploration than it has been considered, and one which can be expected to become even more important in the future.

The priority of this concern is also supported by the positive view of the situation. Negatively there are resources to be protected and used carefully and sparingly. But positively, with the exception of soil that is eroded, the processes concerned relate to renewable resources, the production or productivity of which can be enhanced through better management. Tropical forests and fisheries have a production potential that does not need to be emphasized. And to take two other specific examples, the productivity of the grazing areas of Botswana might be drastically increased if systems of short-duration grazing could be further developed and implemented (Chambers and Feldman, 1973) and the productivity of water in the Dry Zone of Sri Lanka on major irrigation systems could be sharply raised through improved water management (Chambers, 1974). The management of communal resources presents many opportunities.

Managing the family game

Both the problems and the opportunities are mediated through people; the families and communities which depend on and exploit the resources, and the staff of the government departments who protect these resources and regulate their exploitation. There is much to be learned about the interaction of these two groups and about the techniques which can be used for relating them to one another. With policy choices, there is a strictly technical aspect in each case; but it has to be borne in mind that there is always also a management aspect, referring to the management of people, both people in organizations and people in communities. More is usually known about the technical than about the human aspects, suggesting that it is up to the social scientists now to catch up

with their colleagues in the natural sciences and to learn more about the approaches which are possible on the human side.

At this point we need to see the nature of the game. We can distinguish four main interests: first, the national interest in the sustained and improved exploitation of resources, which needs no elaboration; second, the interest of the government department responsible for control and allocation of the communal resources and of its staff; third, the common interest of the community, however defined, which exploits the resource; and fourth, the interests of individual user families. The central problem arises because of a conflict of interest between the last two, that is, between the common interests of the community and the interest of the individual family. For the common interest is in managed and controlled exploitation, but the individual family interest, unless there are powerful social or administrative controls, is to play a highly competitive and destructive game against other families or groups of families, and it is the progress of this game, played rationally and played hard, which consumes, degrades and destroys the resources.

When there is no effective control, sanction or collective restraint, then it is rational for the family to compete ruthlessly for the resource. In the case of common grazing, as Widstrand has said for a pastoral people in Kenya, "...rights in cattle are individual, but at the same time access to grazing is completely free . . . No individual has any incentive to reduce his herd as he is only going to suffer relative to the rest" (1973:52). Every cattle owner tries to increase his herd because every other cattle owner is trying to increase his herd. And in the end everyone loses because the carrying capacity of the pasture diminishes. All, in the end, are worse off than if there had been an enforced system of limitation, except perhaps for a very few who for a time may improve their relative position. The same is true when uncontrolled fishing decimates a fish population in a lake, or when the destruction of forest dries up water supplies, or when anarchy on an irrigation system leads to the collapse of organized society. In each case it is because there are no socially or administratively enforced restraints, or because they are not adequately enforced, that the competitive family game is rational. Conversely, when there are socially or administratively enforced restraints, it becomes rational, for example, for all families to use wide gauge fishing nets, to limit their catches of fish, to abstain from destroying the forest, to limit the number of cattle and follow the grazing rotation, or to accept a system for allocating scarce irrigation water.

Participation versus enforcement

The most palatable prescription for handling these problems is an approach through participation and education. If people only understand where their common interest lies, then, it may be argued, they will collaborate. If they participate in making decisions about the use of communal resources, then they will also be more likely to bring social pressures and sanctions to bear against those who infringe decisions.

This approach may be feasible with small communities which have exclusive access to and control of the resource. Small-scale irrigation systems where one village has one tank (as with the typical *purana* village of the Sri Lanka Dry Zone) can be operated in a very sophisticated and even equitable manner by the community. Similarly, with grazing, where a small group of herders has exclusive control over an area and where they all know one another, they may be able together to decide on grazing rotations (as with some traditional Masai grazing in Kenya). In such circumstances, social sanctions against those who infringe decisions which have been taken in some traditional manner may be very powerful disincentives. But such forms of community control are very vulnerable to two influences.

In the first place, they can be destroyed by trespass, poaching or appropriation from outside the group. If, for example, the dry season reserve of a group of pastoralists is being grazed by other people's cattle, they may themselves move in to get what they can while they can. If fishermen from further along the shore of a lake expand their area of fishing using smaller gauge nets, then other fishermen will follow suit. In these cases, the exclusiveness of access to the resource is lost. What is required is some external protection for the group to penalize and restrain its competitors.

In the second place, these forms of community discipline and restraint become increasingly difficult to initiate or maintain as the size of the management unit and the number of participants increases. There appears to be an inverse relationship between the ability of a community to manage its common resources on its own and the number of members of that community. Interestingly, in Sri Lanka, the distinction between minor and major irrigation is precisely the distinction between irrigation which is small enough for a community to manage on its own, and irrigation which is on a scale which requires bureaucratic intervention. Even where there is bureaucratic intervention, a face-to-face community or group may still be able to manage allocations and rationing among itself; but the allocation which it receives is administered by an external organization.

Even where management units are large, a measure of participation by users in the major decisions may still be possible. On large range management projects and on larger-scale irrigation, the big decisions – about timings of resource use, about allocations to groups or to families – may be taken in some form of public meeting, or meeting of representatives. Various grazing committees or range management committees in Eastern Africa, and the water meetings of Sri Lanka are examples. But once the decisions have been taken, their enforcement is beyond the power of the meeting or of the community. An organization is needed.

Against the background of this discussion we can now see what functions organizations for the management of communal resources have to carry out. They have to protect, to control, to supervise and sometimes to allocate and supply resources. It is no coincidence that we find Forest and Game *Wardens,* Grazing and Water *Guards.* Their work, even though often in the common interest, is bound to be unpopular some of the time with some of the people, and sometimes most of the time with most of them. Such officials often have to prevent people from doing what they want to do; they often have to see that they have less of something than they would like. However much participation there may be, however much education, the irreducible fact is that if they do their work well in the national and common interest they will be subject to local pressures, particularly from those who are more influential, for special concessions; and such concessions, if widespread, destroy the rationale and value of their work.

Implications

The implications are twofold. In the first place, the recruitment, training, organization and style of such organizations must be such that the staff at the lower levels will rationally decide to resist those pressures. This implies that they will be more concerned with the rewards and sanctions within the organization than those which derive some degree of detachment from, and independence of, the local political and social situation; that there must be close supervision and discipline within the organization; that there must be a well-established tradition that junior staff who do unpopular things according to instructions which are in the common interest are supported and rewarded by their seniors. In addition, because of the nature of the work and the strategies of those who try to poach forest land, fish, game, grazing or water, the staff must be mobile, prepared to work at night, and prepared too for the possibility of physical danger. What is required, in short, is something like a quasi-police or quasi-military organization.

The second implication is that the staff in the organization must have high-level and consistent political support in their difficult and sometimes unpopular work. The frequent flabbiness of irrigation and grazing control organizations is not entirely their own fault. There is no incentive for a water guard to refuse to issue additional water to an influential farmer who demands it out of turn if that farmer can threaten his career through a political network. It makes sense for junior staff in these organizations to carry out their unpopular duties only if they are rewarded and not penalized for so doing; and often that is a matter determined at a political level. Political education, will and discipline may often be a precondition for the effective operation of organizations for managing communal resources.

Conclusion

Two basic related principles underlie this discussion. The first is that the type, style, and procedure of an organization should be appropriate to its tasks. A highly authoritarian and hierarchical organization is inappropriate for agricultural extension where this is meant to be adaptive, innovative and advisory. A relaxed and permissive organization is inappopriate for policing functions or for rationing the supply of resources such as water between individuals and groups. The current priorities in many places may well be for the agricultural extension organizations to develop freer communication between levels, to become more research-oriented and at the same time to become more manipulable, for example in reaching new target groups of the poorer farmers; and for organizations which manage and allocate access to communal resources to tighten up, to become more disciplined in style and more predictable and reliable in performance.

The second is that a management approach must concentrate on making it rational for staff in those organizations to do what is required of them. If adaptive research is desired, then more discretion has to be devolved and local initiative rewarded, including the reporting of information that is true but discordant. If more strictly enforced rotations of grazing or issues of irrigation water are required, then the system of supervision, rewards and sanctions within the organization and between the organization and its environment must be so arranged and operated that it is rational for staff to do what is bound to be unpopular with their public client group.

The changes required for more effective field administration are not easy to achieve. They are made more difficult by having to start from a base of ignorance of appropriate management practices. One strategy is:

(a) setting aside a few areas for experimental

treatment. The Kenya Government's Special Rural Development Programme,[3] which was explicitly experimental in purpose, and the Agrarian Research and Training Institute, Colombo's field laboratory at Beminiwatte, may be important prototypes and sources of experience here for the design of experimental situations;

(b) encouraging management experiments. Social scientists, management consultants, and the staff of institutions which train for the public service can be encouraged to make selective use of whatever seems potentially valuable in the literature on management,[4] and to devise, test, evaluate and where appropriate replicate new approaches and techniques in the experimental situations;

(c) diffusing the experience. At a local or national level, the staff who gain experience of a new system in the experimental situation may themselves be good trainers of others as the system is spread.

This leads into the final point. A continuing priority is the collation and exchange of experience not just within but also between countries and regions. As new activities become prominent — as perhaps with adaptive research, with reaching the smaller, poorer farmers, with managing communal resources — there is a danger that excellent ideas will be known and used only locally. The need is for repertoires of techniques to be collected and built up and to be internationally available to all who can use them. Impressive international institutions have been set up to develop crops: the International Maize and Wheat Improvement Centre (CIMMYT); the International Rice Research Institute (IRRI); the International Institute for Tropical Africa (IITA); the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); the International Potato Centre (CIP); and the International Centre for Tropical Agriculture (CIAT). These organizations collect genetic material from the field in many countries, crop by crop, build up germ plasm banks, and develop and diffuse new higher-yielding varieties. But where are the impressive international institutions set up to collect management techniques from the field in many countries, task by task, to build up repertoires of procedures, and to develop and diffuse higher-yielding varieties of management? And if any institutions come to mind, why do they in fact not do this, or not do it more, or more effectively? The fact seems to be that management in field administration is undeveloped and little explored — a frontier. It is time that it was more extensively, more energetically and more systematically opened up.

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[3] For accounts of which see Heyer, Ireri and Moris, 1971; Nellis, 1972; IDS, 1972; Chambers, 1974 and Leach, 1974.

[4] There is a problem of knowing what to select from an extensive, mainly business management, literature. As good a starting point as any may be some of the writings on Management by Objectives (MBO), for which see Garrett and Walker; 1969, Humble, 1969, and Reddin, 1971.

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